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SPECIFICATION FOR NON-MAGNETIC STAINLESS STEELS FOR ELECTRICAL APPLICATIONS

PART 3 SPECIFIC REQUIREMENTS FOR SHEETS, STRIPS AND PLATES

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SPECIFICATION FOR NON-MAGNETIC STAINLESS STEELS FOR ELECTRICAL APPLICATIONS

PART 3 SPECIFIC REQUIREMENTS FOR SHEETS, STRIPS AND PLATES

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Indian Standard

SPECIFICATION FOR NON-MAGNETIC STAINLESS STEELS FOR ELECTRICAL APPLICATIONS

PART 3 SPECIFIC REQUIREMENTS FOR SHEETS, STRIPS AND PLATES

0. FOREWORD

0.1 This Indian Standard (Part 3) was adopted by the Indian Standards Institution on 30 August 1983, after the draft finalized by the Alloy Steels and Special Steels Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard has been prepared with a view to guide the industry with regard to manufacture and use of non-magnetic stainless steel wires, sheets, strips and plates for electrical applications.

0.3 This standards is being published in three parts, as given below:

Part 1 General requirements
Part 2 Specific requirements for binding wires
Part 3 Specific requirements for sheets, strips and plates for electrical applications.

0.4 This standard keeps in view the manufacturing and trade practices followed in the country in this field. In the formulation of this standard assistance has been derived from JIS — C 2507-1977 'Tin coated non-magnetic steel wire for armature binding' issued by Japanese Industrial Standards Committee.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard (Part 3) lays down the requirements for chemical composition, mechanical, electrical and magnetic properties for non-magnetic stainless steel sheets, strips and plates for use in electrical machines and parts that shall not disturb a magnetic field.

2. GENERAL REQUIREMENTS

2.1 The general requirements for manufacture, tests, sampling, freedom from defects, packing and marking shall conform to those given in IS : 10632 (Part 1)-1983*.

3. CHEMICAL COMPOSITION

3.1 The ladle analysis of steel, when analysed either by the method specified in the relevant parts of IS : 228† or any other established instrumental/chemical method, shall conform to the requirements specified below:

Constituents	*Percent*
Carbon, *Max*	0·08
Silicon, *Max*	0·75
Manganese	1·0-2·0
Sulphur, *Max*	0·03
Phosphorus, *Max*	0·03
Nickel	12·0-13·0
Chromium	17·0-19·0
Cobalt, *Max*	0·3
Molybdenum, *Max*	0·3
Copper, *Max*	0·25
Iron	Remainder

3.1.1 In case of dispute the procedure given in the latest edition of relevant parts of IS : 228† for chemical analysis shall be the 'referee method'.

3.2 Product Analysis — The permissible variation in case of product analysis from the limits specified in **3.1** shall be as given in Table 1 of IS : 10632 (Part 2)-1983*

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*Specification for non-magnetic stainless steels for electrical applications:
Part 1 General requirement.
Part 2 Specific requirement for binding wires.

†Methods of chemical analysis of steel (*second revision*). (Issued in parts).

4. DIMENSIONS AND TOLERANCES

4.1 The nominal sizes of sheets, strips and plates, shall be as agreed to between the manufacturer and the purchaser.

4.2 The tolerances for sheets, strips and plates shall be in accordance with **11.1** of IS : 6911-1972*.

5. SURFACE FINISH

5.1 Finishing requirement for plate, sheet and strip shall be in accordance with **10** of IS : 6911-1972*.

6. HEAT TREATMENT

6.1 The sheets, strips and plates shall be supplied in cold-worked, annealed or softened condition as agreed to between the purchaser and the manufacturer.

7. TESTS

7.1 Tensile Test — The tensile strength of the steel sheet, strip and plates, when tested in accordance with IS : 1608-1972† or IS: 1663-1972‡, shall be as given in Table 1.

TABLE 1 TENSILE STRENGTH REQUIREMENTS

PRODUCTS	TENSILE STRENGTH, *Min* N/mm^2 (kgf/mm^2)		CONDITION
Sheet, strip and plate	588	(60)	Soft
	735-835	(75-85)	Half hard
	882-980	(90-100)	Hard

NOTE — The length of the test piece between the jaws shall be 200 mm.

7.2 Electrical Resistivity — The electrical resistivity when measured in accordance with IS : 3635-1966§, in the cold rolled condition, shall have the minimum value of 78 microhm.cm for all section.

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*Specification for stainless steel plate sheet and strip.

†Method for tensile testing of steel products (*first revision*).

‡Method for tensile testing of steel sheet and strip of thickness 0·5 mm to 3 mm (*first revision*).

§Method of test for resistance of metallic electrical resistance material.

7.3 Magnetic Property

7.3.1 *Amagnetism* — Non-magnetic characteristics of the steel shall be evaluated in hard state. The dimensions of test pieces shall comply with the type of permeameter or any suitable apparatus mutually agreed to by the purchaser and the manufacturer. The value of permeability so determined shall not be more than 1·02 at field 800 ampere turn/cm (1000 Oersted) at 50 percent cold-worked state.

8. SAMPLING

8.1 The requirements for sampling and the criteria for conformity shall conform to those given in **9.2** of IS : 10632 (Part 1)-1983*.

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*Specification for non-magnetic stainless steels for electrical applications: Part 1 General requirement.

(*Continued from page* 2)

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2